

UNMANNED WARFARE: SECOND AND THIRD ORDER EFFECTS  
STEMMING FROM THE AFGHAN OPERATIONAL  
ENVIRONMENT BETWEEN 2001 AND 2010

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by

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

## ABSTRACT

UNMANNED WARFARE: SECOND AND THIRD ORDER EFFECTS STEMMING FROM THE AFGHAN OPERATIONAL ENVIRONMENT BETWEEN 2001 AND 2010, by Major Matthew C. Crowell, 87 pages.

This thesis builds on research into the second and third order effects of unmanned warfare on the modern battlefield and provides a single source document outlining the major effects seen throughout the Afghan operational environment between 2001 and 2010.

When the United States fired the first Hellfire missile from a Predator aircraft in combat, the very nature of warfare took a dramatic step into the future. With new assets capable of remaining airborne for nearly 24 hours and live video feeds streaming to virtually any location in the world, the introduction of unmanned combat onto the battlefields in Afghanistan created many second and third order effects.

This thesis captures four effects of particular significance. These four include: changing the nature of combatants, policy lag from the national level, a shifting in roles of the primary battlefield observer, and a relaxed use of the military instrument of national power.

Further research into these five effects as well as others yet to be seen must remain a top priority for the military of the twenty first century.

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## CHAPTER 1

### INTRODUCTION

There is only one: combat. However many forms combat takes, however far it may be removed from the brute discharge of hatred and enmity of a physical encounter . . . it is inherent in the very concept of war that everything that occurs must originally derive from combat.

— Carl Von Clausewitz, *On War*

When the United States fired the first Hellfire missile from a Predator aircraft in combat, the very nature of warfare took a dramatic step into the future. The Predator or MQ-1 aircraft flies primarily through the use of computers that receive inputs from a pilot who can be physically located halfway around the world. As the first human who interacts with the Predator drone, the pilot maintains overall direct control of any actions taken. The weapons system utilizes a sensor operator primarily responsible for controlling the cameras and targeting systems carried aboard the Predator. Both the pilot and sensor operator have the capability to hand off control to replacement personnel, making the endurance of the aircraft and weapons load out the only limitations to continued combat operations. This capability allows for significant increases in lethality not attainable by manned assets due to many factors, but endurance and the resultant persistence over a battlefield rise to the top of the list.

With a cursory look at the topic, unmanned combat vehicles introduce many fascinating concepts. These assets do not need food or water. They do not get tired after being engaged in combat operations for hours or days. They simply need fuel and a resupply of weapons. If an area becomes a particular concern for a commander, a request to move an unmanned aircraft, or drone, over the battlefield can provide a persistent asset

capable of intelligence, reconnaissance, and surveillance as well as direct fires. These factors, along with a myriad of additional ones, have driven a truly amazing production line that increased the total number of unmanned combat aerial vehicles owned by the United States from one to 5,000 between 1998 and 2008 (Tumin 2008, 2). According to information released by the United States Air Force quoted by a New York Times article, “Predators and Reapers set off 219 missiles and bombs in Afghanistan in 2009,” a steady increase over the “183 in Afghanistan in 2008 and 74 in 2007” (Drew 2010). Ultimately, unmanned combat assets almost certainly save the lives of numerous United States soldiers, the forces of our allied partners, and individuals within the local Afghan populace on a daily basis. How then, can an emerging technology with such incredible capabilities have “some counterinsurgency experts wondering whether it does more harm than good” (New York Times 2010). Some of the answers to this question likely lie on the battlefields in and around Afghanistan. This thesis seeks to research the archives available as well as generate new information to answer one main question: what second and third order effects have emerged throughout the Afghan operational environment due to the introduction of unmanned combat vehicles from 2001 to 2010?

Along with the primary question, several secondary questions will be researched to add a consolidated collection of information on the topic of unmanned warfare in Afghanistan. A few of these secondary questions include:

1. If United States war fighters utilize unmanned combat platforms, can an enemy effectively and legally gain support for operations within America’s borders due to a change in the location of legal combatants? What impact does this shift in target sets have on the nation as a whole?

2. How has the rapid pace of technology fundamentally changed the requirements for forward looking proactive policies versus reactive policies? Was the armed Predator aircraft employed effectively and efficiently when initially deployed?

3. Do the unique capabilities of unmanned warfare add a new dimension to the battlefield or simply enhance and modify existing functions? Who maintains the greatest capability to provide long term continuity of the battlespace, specifically when operating in vast remote areas?

4. What side effects does the reduction of risk to United States forces generate by the use of remotely operated assets? Will a population become disconnected from the implementation of national foreign policy when the direct personal connection of sacrificing the lives of loved ones disappears?

### Background

The recent surge in military operations since 11 September 2001, created an opportunity for a number of technological innovations. One of the most significant innovations affecting the battlefield today is the remotely piloted aircraft. Interestingly, the mention of this capability could elicit one of several emotions from an individual. Some might perceive this new capability as the latest example of technological genius shaping the battlefield in a manner that saves lives and minimizes the atrocities of war. However, others might view the use of a weapon that utilizes an operator halfway around the world with little to no personal danger as reckless, cowardly, and potentially a violation of the laws of war.

This thesis will not try to argue either of the above assertions, nor will it attempt to shed light on the overall ethical and moral questions of unmanned warfare. However,

the understanding that the above extremes exist opens many aspects surrounding the research into the effects of unmanned warfare throughout the Afghan operational environment. One can typically see how the physical effects of an unmanned combat vehicle shape the battlefield during protracted combat operations. From the real time video feeds, to the 24 hour coverage of an area of interest, tangible effects allow coalition forces freedom of movement and near real time intelligence of a dynamic combat environment. By contrast, determining the second and third order effects, or unintended consequences, of unmanned warfare becomes a much more difficult task. This thesis addresses this area of involvement. Some of the effects tie directly back to the battlefield with direct correlations to the combat forces or local populace. However, due to the nature of uncertainty in wartime environments, some of the effects will not provide definitive proof to their connection with unmanned warfare. This limitation does not make these effects less important, but rather some battlefield effects that elude attempts at pinpointing a definite causal relationship emerge as extremely noteworthy. As a result, the ability to only establish a reasonable connection to the introduction of unmanned warfare merely necessitates the requirement for further research and discussion of these effects in the years ahead.

### Assumptions

This thesis assumes that the United States will continue to utilize unmanned warfare for the foreseeable future. Additionally, this thesis assumes that research and technology will develop new unmanned combat systems for use in future conflicts making the application of this thesis viable to future combat operations. Finally, this thesis assumes that information regarding Afghan areas of operation and local populace

opinions found in interviews with individuals who served in an area as well as comments made by local civilians to be both credible and representative of the area as a whole.

### Definitions

Drone. An airborne unmanned combat vehicle capable of remote operation from locations well beyond a particular battlefield of employment.

Unmanned combat vehicle. Any combat system capable of employing lethal force without the direct physical interaction of its operator. This thesis will focus on current man-in-the-loop systems as opposed to autonomous unmanned systems, however some of the concepts and information gained from the research may apply to future systems as well.

Unmanned warfare. Used to describe any lethal combat action where the operator is not physically located with the weapon system employing the force. An important distinction should be made between a projectile weapon such as a missile or rocket and a remotely operated system which employs weapons. For this thesis, missiles and rockets do not constitute unmanned warfare. Of note, within the Afghanistan area of operations, the Predator and Reaper aircraft account for a preponderance of the unmanned warfare assets as related to this thesis. With that in mind however, several examples outside of Afghanistan, such as strapping a claymore to a remote control car or flying an otherwise “unarmed” unmanned aerial vehicle into a target, show that creative United States soldiers have utilized a few non-traditional assets in unmanned warfare roles as well. This thesis does not consider mines, trip wire weapons, and other relatively passive and indiscriminate weapons as unmanned warfare for the purposes of this document.

### Scope

This study will look specifically at the war in Afghanistan from 2001 to 2010. Unmanned warfare was not present in Afghanistan at the beginning of in 2001, but this time will be researched for potential reference points and to build the background information leading up to the actual deployment of the armed Predator. Additionally, the intent of this thesis is to highlight the second and third order effects of unmanned warfare on the Afghan battlefield and not the inherent combat capabilities provided by such systems. Some research into the basic capabilities will be done as necessary to support the overall goal of finding resultant effects. This thesis studies the Afghan operational environment, defined as the battlespace containing both Afghanistan and western Pakistan territories linked to the fight against insurgents operating in both areas. This thesis also includes research into the pilots and sensor operators flying remotely piloted aircraft in Afghanistan regardless of their actual physical location.

### Limitations

This thesis only researches unclassified material openly available through public sources.

### Delimitations

The time period of this study, 2001 to 2010, covers the entire period of unmanned warfare in Afghanistan, to include the introduction of unmanned warfare by the United States. This study does not include information from the war in Iraq.

### Significance of the Study

The research accomplished for this thesis concerns two main areas of significance: mitigating adverse second and third order effects of unmanned warfare and building a body of information that can be referenced in the development of future unmanned combat capabilities. The first area dealing with second and third order effects applies to the ongoing war in Afghanistan as well as future conflicts conducted with the current unmanned combat vehicles. The second area focuses on the exploitation of this research to develop capabilities into future unmanned combat systems to mitigate adverse effects or enhance the positive effects of unmanned capabilities on the battlefield.

### Conclusion

The overall amount of current research into the effects of unmanned warfare remains in the infancy stage even after ten years of active use in combat. This thesis continues this research and specifically focuses in on the second and third order effects seen throughout the Afghan operational environment. Generating provocative thought and additional insight into the many dynamics of this new method of combat resonates as the overall goal of this research, which will be conducted through both confirmatory and exploratory means. The capabilities of unmanned combat vehicles present many new, unique, and amazing direct impacts on the twenty first century battlefield; however, truly developing an understanding of the myriad of additional effects will ultimately allow the United States to proceed into the next era of warfare successfully.

## CHAPTER 2

### LITERATURE REVIEW

What does it mean when “drone” has become a colloquial word in Urdu and rock songs that Pakistani youth vibe to talk about America not fighting with honor?

— Peter Warren Singer, Congressional Testimony

When embarking on a journey to flush out underlying cause and effect relationships, as well as the dynamics of a new interaction in the lives of human beings, an interesting spider web begins to develop. For unmanned warfare and as it relates to the war in Afghanistan, this web begins to take form at the beginning of the twenty first century. There exists a multitude of literature available at the unclassified level that provides insight into the primary question of what significant second and third order effects, or unintended consequences, developed throughout the Afghan operational environment due to the introduction of unmanned warfare. This chapter relates to the overall development of this research question by building a comprehensive understanding of what literature currently exists, as well as some of the limitations or biases that exist within this literature. Chapter 1 established the need for the accomplishment of this research and chapter 2 will include a summary of the most significant literature dealing with the introduction of unmanned combat vehicles over the past decade. However, one notable aspect pertaining to the overall development of this body of literature warrants some additional emphasis prior to digging into the specific literature review for this thesis.

Interestingly, the general discussion and amount of literature available regarding unmanned warfare did not increase either linearly or exponentially, but rather in a



cyclical manner. Figure 1 shows results from a quick search for “armed drone” using Google and then cross referencing the publishing date of the items found. Although not scientific by any means, this manner of illustration clearly shows two peaks which need to be understood as they relate to the material available for research. The first major increase in the discussion of armed drones appeared in 2001 and 2002 during the beginning of combat operations in Afghanistan. Due to the nature of the dynamics created by the attacks in the United States on 11 September 2001, the general theme during this timeframe focuses more on support for military action and less on the underlying issues discussed both in literature written prior to the attacks and those which have emerged in the second peak. It is important to understand that this dynamic adds certain biases into the literature generated around this time period from late 2001 through 2002. To the maximum extent, this thesis attempts to take this fact into account while analyzing the information and generating the resultant cause and effect relationships. During the second increase in literature seen in figure 1, a steady climb begins in 2008 as the United States increased the overall campaign in Afghanistan and particularly in the tribal areas along the border with Pakistan. Of note, this second rise leveled off and remained steady through 2010 at a level approximately three times that of 2007.

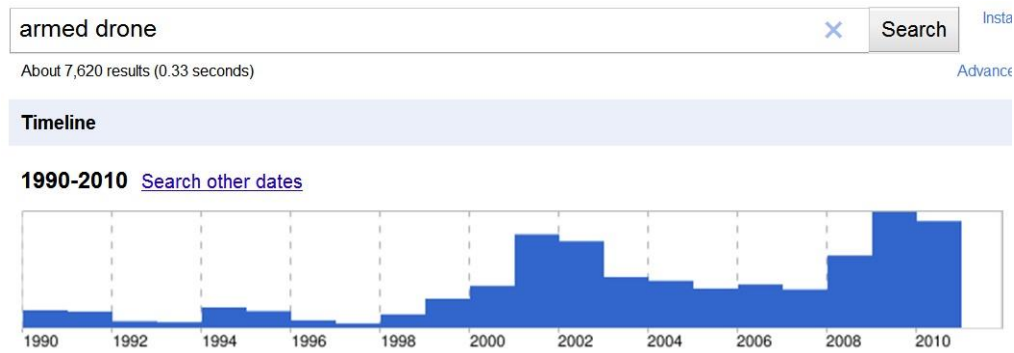


Figure 1. Armed Drone Google Search

*Source:* Created by author.

With the above context in mind, the research for this thesis focuses on three notable areas of literature as they pertain to the second and third order effects stemming from the use of unmanned combat vehicles over the battlefields in the Afghanistan area of interest. In broad terms, the literature pertaining to the introduction of unmanned warfare in Afghanistan falls into the following categories:

1. Direct accounts from individuals observing the effects of combat
2. Research and analysis conducted by experts studying the Afghan region
3. Other literature capturing opinions and notable issues in the Afghan region

This literature review compiles the applicable research into these three categories to allow a comprehensive comparison of available information.

#### Direct Accounts from Individuals Observing the Effects of Combat

One of the most important areas of literature in the research of second and third order effects in Afghanistan resides in the interviews with the local populace as well as the troops who fought on the battlefield. The majority of the interviews found surrounding this topic did not exist in an original format, but rather as direct quotes

published by the interviewer. In actuality, none of the first person accounts used in this thesis originate with the author, and therefore a certain amount of prudence must be applied to the application of context. The myriad of resources compiled here attempt to level this effect where possible and the underlying context has been framed for the application in analysis of each instance. In certain cases, even this analysis of how certain direct quotes merge into the various media outlets helps develop certain trends. As an example, The *Daily Times* newspaper, a leading English newspaper in Pakistan, references drone operations quite often. The overall tone of these articles generally appears neutral in content, neither taking an aggressive stance for or against the operations in the northwest tribal areas. With that being said, the articles tend to show significant support and understanding for the general Pakistani population, understandably, and the first person accounts gained from this source as well as similar ones do not necessarily represent the overall population if taken either alone or out of context.

Another important resource, the recently published book *Predator: The Remote-Control Air War Over Iraq and Afghanistan: A Pilot's Story*, captures a first person perspective from the period of 2003 to 2010 by author Lieutenant Colonel Matt J. Martin. Lieutenant Colonel Martin, who began flying Predator aircraft after a career as a navigator in the United States Air Force, adds significant depth to the specific area of how unmanned warfare has changed the nature of combatants. As might be expected, the opinions contained in this book display a basic slant aimed at furthering support for remotely piloted aircraft. Despite this fact, his first hand accounts provide uncommonly open insight into the world of this new generation of combatant.

Several institutions have conducted extensive surveys in the Afghan region. Two organizations, the New America Foundation and Terror Free Tomorrow, jointly conducted a face-to-face public opinion survey in the Federally Administered Tribal Areas of Pakistan, which borders eastern Afghanistan, from 30 June to 20 July 2010. The results of this survey contain many significant points of interest coming from an area of the “greater Afghan battlefield” where United States drones operate regularly. This survey compiled both statistics based on question and answer sessions as well as some direct insight into certain interviews. Specifically, the results from these surveys, when merged with additional interviews and analysis from experts in this field, provide depth to the researched area of how unmanned warfare affects the civilian population in and around an area influenced by unmanned warfare. This information becomes especially important when pulling out the unintended consequences of warfare created by this new change to unmanned systems and how these effects differ with general themes seen when actual soldiers conduct operations.

Research and Analysis Conducted by Experts  
Studying the Afghan Region

Peter W. Singer authored the most recent and notable book on the subject of unmanned warfare, *Wired for War: The Robotics Revolution and Conflict in the 21st Century*. Singer, who works at the Brookings Institute, and leads their research and analysis on twenty first century defense issues, interviewed a myriad of individuals during his research for this book (Singer 2010a). Specifically, Singer worked with Predator sensor operators, Predator squadron commanders, four-star generals, White House advisors, and service secretaries (Singer 2010a). This book helps develop

background and certain interest areas used to look at other research material regarding Afghanistan and provides a capability to locate and research additional unintended consequences of unmanned warfare. Throughout his analysis, Singer brings out many aspects of unmanned warfare from the period of 2001 to 2009 which, when fused with additional information from both other sources of the same timeframe as well as new information from 2010, provides significant insight into most of the major second and third order effects as they relate to the Afghan operational environment. Of note, Singer appears to have conducted a majority of the research for *Wired for War* between 2007 and 2008.

Expert testimony to Congress proves to be another important source for locating second and third order effects of unmanned warfare. In March and April of 2010, numerous experts testified to the Committee on House Oversight and Government Subcommittee on National Security and Foreign Affairs about unmanned systems technology and the legal implications of using drones in the Afghan region. The range of testimony went from that of author Peter Singer, who framed a number of questions surrounding unmanned warfare, to that of Professor Kenneth Anderson, a member of the Hoover Task Force on National Security and Law, who focused primarily on the application of existing laws of war to unmanned platforms. Notably, the discussion on the inability of policy to keep up with the rapidly changing technologies of the twenty-first century provides particular use in this thesis. This effect of policy lag appears even more significantly in the earlier testimonies given to Congress during the hearings during 2003 and 2004 conducted to produce the 9/11 Commission Report. The information gleaned

from these interviews comes from the highest levels of government and holds great importance.

#### Other Literature Capturing Opinions and Notable Issues in the Afghan Region

A significant amount of literature useful in the research on unmanned warfare in Afghanistan resides in the general media forums, and although they do not generally provide firsthand accounts, they often capture the unintended consequences not found elsewhere. Numerous newspaper and magazine articles have been written that capture certain aspects of the battlefield. Taken together, these various accounts can be used to create a relatively complete view of many aspects where unmanned warfare has affected the battlefields in Afghanistan. Finally, a cross-reference of documents written by other researchers to include those from the United States Air University and the United States Army War College provide additional breadth to this research on unmanned warfare.

## CHAPTER 3

### RESEARCH METHODOLOGY

Ultimately, no one can fully predict the second order effects of innovations, much less third and fourth order effects. But this does not justify ignoring them.

— Steven Metz, *Armed Conflict in the 21st Century*

Throughout recorded history, the requirement for war and the use of lethal force as a means of protection has remained constant and the techniques used to conduct war have gradually evolved with the changing technologies of each generation. Or, one might argue that this relationship actually exists in the opposite manner and technologies have evolved, sometimes gradually and sometimes not so gradually, to keep up with the changing dynamics of the battlefields of a given time period as well as the overarching world political views. This may well be a question of which came first, the chicken or the egg, where neither assertion completely answers the question. However, when looking at the introduction of unmanned warfare in the manner being addressed here, this topic of discussion leads to a questioning of the driving forces behind armed conflict. Specifically, has the development of new technologies allowed unmanned warfare to finally become a reality, or have the requirements of war ultimately led mankind to the development of those technologies required to further increase the distance between warriors? The importance of this question does not lie in finding an answer, but rather in the ability to set a frame of mind requiring one to ponder the complex dynamics at work in any human interaction, and especially when looking at how the use of lethal force factors into the equation.

In answering the overall question regarding the second and third order effects stemming from the use of unmanned warfare in Afghanistan, chapter 3 explains the method used to break down the components of each specific effect captured throughout the course of this research. This chapter allows the reader to effectively understand the methodology used to support and justify each effect discussed in the analysis portion of this thesis. The originality of this thesis lives between an exploratory and confirmatory method of approach. The majority of the major concepts written about here exist in previous resources to include the book *Wired for War*. However, merging these basic constructs and significant quantities of additional resources combined with the methodology laid out in this chapter pushes the research of this thesis into the exploratory realm. Additionally, this thesis strives to identify factors related to the primary research question with the intent of providing a concise single source document that consolidates the side effects of unmanned warfare. Finally, the general pattern of data collection and analysis in this thesis aims at creating a descriptive study focused on providing a detailed picture of both the depth and breadth of information currently available on this topic, as well as the results from merging this data into developed resultant effects.

Chapter 2 explained the overall picture pertaining to the available literature allowing the further development of this research question. With this literature in mind, the research methodology for this thesis lays out three main sections that will be used to analyze the data collected. First, the discussion of each effect caused by the introduction of unmanned warfare will begin with a comprehensive summary of the applicable data pertaining to the specific effect. Second, the data laid out in the first section of analysis will be merged into a fully developed explanation of the effect to clearly define the



specific concepts included within each effect. Third, the analysis of each effect will conclude with a projection of each effect back into the battlefield environment to better explain the dynamics of the effect in the context of application.

### Comprehensive Summary of Data

This thesis will develop each specific area of study by first compiling the significant information from the various resources pertaining to a certain second or third order effect caused by unmanned warfare in Afghanistan from 2001 to 2010. When logical, the compilation of data begins with the first person accounts of matters directly related to the effect. These accounts appear in several forms to include first person books or articles written by individuals present to witness the actual events as well as interviews of United States and coalition soldiers, enemy combatants, local civilians, government officials, and others. These resources account for the preponderance of hard data captured that support the development of this thesis.

Next, the information gained from others who have studied this area of interest will be described and merged into the first person accounts to provide the differing views surrounding each effect being discussed. When possible, multiple viewpoints have been incorporated to allow a better understanding of the varying complexities of the second and third order effects. At times these effects tend to blend with multiple causal factors and some interpretation has been applied to frame the information in a manner useable for this thesis. Specific discussion of each point where this occurs helps minimize the negative effect caused by such ambiguities.

After building a comprehensive picture of an effect, the analysis will focus on highlighting the more broad based opinions and general issues surrounding the Afghan

region as they relate to each effect. Capturing these opinions allows an additional level of breadth and understanding to this subject. Admittedly, if taken individually, a number of these resources do not yield a level of fidelity to correlate back to a specific cause and effect; however, when taken in context with the previous two sections of information and supplemented with critical analysis, they provide a prudent reader the capability to assess their merit as they pertain to the topic at hand.

This section of effect analysis will generally consist of a facts based approach and lay out the many facets of information as they relate to each specific area of research. Reading this portion of analysis provides a clear understanding of the information used to compile the detailed summary of the effect that follows.

#### Detailed Summary of the Effect

This section of analysis will consist of the synthesis of data by the author into a well defined effect based on the data collected and presented in the first step of analysis. By the end of this section of the analysis, a reader will understand the detailed concept of each effect as well as the specific boundaries placed on the effect as supported by the research. Merging the various layers of literature developed in step one of this analysis creates a well supported structure around the effect and can then be used to explore both real world examples on the battlefields of Afghanistan as well as other postulated scenarios to broaden the application of this research beyond the basic level.

#### Effect Applied to the Battlefield

In any endeavor, some of the most beneficial results live in the ability to understand the greater meaning of an experience and then apply that understanding to

similar situations. The final section of analysis in this thesis will accomplish this goal by building on the detailed definition of an effect as explained above through an application based model of analysis. Both real world examples and postulated scenarios provide excellent sources of examination to truly build a deeper understanding of the complexities involved in the emerging arena of unmanned warfare. Many crossroads of moral, ethical, psychological, and logistical issues meet with the introduction of any new technology. With that said, unmanned warfare introduces a type of combat that transfers risk in ways not yet fully understood while at the same time making one wonder if chivalry no longer applies to armed combat. The combination of these two factors certainly make this an interesting time to observe the changing dynamics of a battlefield and one can only hope to project some level of clarity on where this course will lead.

### Conclusion

This chapter laid out the three steps which will guide the analysis in chapter 4 to examine the most significant second and third order effects stemming from unmanned warfare over the past decade. The first step captures the available research and information. Next, a detailed summary develops the resultant effect into a clearly defined entity. Finally, an application of each effect builds a deeper understanding of the complex nature these effects have on modern warfare.

## CHAPTER 4

### ANALYSIS

You can't say it's not part of your plan that these things happened, because it's part of your de facto plan. It's the thing that's happening because you have no plan. . . . We own these tragedies. We might as well have intended for them to occur.

— William McDonough, *Designing the Next Industrial Revolution*

This chapter analyzes four specific areas answering the primary research question of what second and third order effects have the introduction of unmanned combat vehicles to the battlefield in Afghanistan created from 2001 to 2010. Using the methodology described in chapter 3, the analysis contained in this chapter first describes how the introduction of unmanned combat platforms into the battlespace in and around Afghanistan began to change the fundamental nature of combatants. Next, the discussion focuses on the concept of how a lagging policy at the national level regarding the use of remotely piloted aircraft in an armed role left the military and other government agencies unprepared for the rapidly developing technologies when they hit the battlefield. The third effect discussed here analyzes how the increased capabilities of persistence over a battlespace begin to shift the role of the primary battlefield observer. This shift results in certain circumstances where pilots and sensor operators thousands of miles away from the actual fight possess the best understanding and continuity within a specific area of operation. Finally, chapter 4 concludes with an analysis of how the introduction of unmanned warfare raises the potential for a relaxed use of the military instrument of national power due to new factors and capabilities changing the cost versus benefit analysis when senior leaders decide when, where, and how to employ the various aspects

of national power. For the purposes of this thesis, relaxed implies a loosening of the stringent requirements normally associated with the use of military power.

Each section focusing on these individual factors begins with a quick overview of the effect and some background information. Following this introduction, the concise summary of data accounts for a majority of the hard facts and in depth discussion presented in this chapter. Next, the summary of the effect consolidates the major points previously discussed and presents them in a clear and concise manner to help simplify the process of understanding the actual impacts of the analysis conducted. A final discussion of how the effect directly impacted an actual event or how the implications derived from the analysis could apply to a postulated scenario provides a concrete framework helpful in adding additional depth to the understanding of each effect. Taken together as a whole, this chapter presents four specific second and third order effects in a manner useful to a broad array of military and civilian leaders desiring to gain a better understanding of the complexities surrounding the introduction of unmanned warfare.

### Changing the Nature of Combatants

Over the past several thousand years, warriors continually drove the evolution of warfare while attempting to gain an advantage over their foe by distancing themselves from the fight, and therefore limiting their enemy's capability to cause harm. This evolutionary process likely began when the first caveman picked up a stick to fight while the rival caveman still used his bare hands. With the extended range of the stick, the innovative man gained an advantage due to the increased distance at which he could conduct his "war." The next logical step appears as the now disadvantaged caveman sees the requirement to change the dual in his favor and picks up a stone. However, by using

just his hands to throw the stone, he quickly becomes vulnerable again as the first caveman ingeniously uses a piece of animal skin to swing a stone an even further distance. This trend continued until today, where the pilots and sensor operators of unmanned aerial vehicles “fling” their stones from as far as 12,000 miles away (approximately half the circumference of the earth).

These operators fall into a completely new and previously incomprehensible category of combatant as they actively “pull the trigger” in combat from the sanctuary of their own protected homeland. This distancing from the front lines produced a number of additional effects captured here as the changing nature of combatants. Today’s combat environment, with the increased use of unmanned platforms, creates unique effects on those engaging in war. The primary focus within this thesis centers on two main effects caused by removing this new breed of combatant from the battlefield and specifically concentrates on the pilots and sensor operators of the Predator and Reaper aircraft. First, the capability to conduct operations with lethal force without ever actually entering a combat zone has levied a number of strains and stresses on the individuals involved. Second, the placement of these individuals and their accompanying equipment within a major population center of the United States brings about several interesting new realities for the nation concerning these war fighters and the corresponding potential risks for the collocated population.

### Comprehensive Summary of Data

“It sounds strange but being far away and safe is kind of a bummer. The other guys are exposing themselves, and that to me is still quite an honorable thing to do. So I feel like I’m cheating them” (Pitzke 2010). Major Bryan Callahan who flies remotely

piloted aircraft in the United States Air Force made that statement during an interview in March 2010. A number of other pilots in his same shoes have made similar statements over the past ten years. In looking into the various newspaper articles and published interviews of Predator and Reaper aircraft operators, a picture begins to take form showing a web of complex situations and conflicting feelings that have emerged since the introduction of unmanned warfare. Lieutenant Colonel Martin admitted to “feeling a bit stunned” following his first combat sortie flying a Predator in which he participated in the coordination of an AC-130 attack (Martin 2010, 31). In fact, the book Lieutenant Colonel Martin published at the end of 2010 titled *Predator, the remote-control air war over Iraq and Afghanistan: a pilot’s story* provides many intriguing first person insights into the emerging dilemmas for this newly developing category of warrior.

One particularly important area deals with combat stress. Although these pilots and their sensor operators fly their missions from thousands of miles away, they do not escape the stresses that come along with waging war. To the contrary, the capability to wage war 24 hours a day, 7 days a week, in a deployed-in-place status at an Air Force base within the United States appears to be inflicting stress and fatigue at “the same, if not higher, levels than many units physically in the war zone” (Singer 2009a, 347). However, this understanding only seems to have emerged within the past few years of unmanned warfare operations. In an article depicting the evolution of “drone operators,” a Washington Post staff writer asserted that senior Air Force leaders believed as recently as 2006 that “even though Predator crews were flying combat missions, they weren’t actually in combat” (Jaffe 2010). He made this conclusion based on several facts surrounding the events that led to the attack which killed Abu Musab al-Zarqawi in 2006.

The pilot flying the F-16 which dropped the actual bomb received the Distinguished Flying Cross, an honor also bestowed on Charles Lindbergh following “the first solo flight across the Atlantic Ocean” (Jaffe 2010). However, the aircrews of the Predators which spent over 630 hours in the days and months leading up to the strike simply “received a thank-you note from a three-star general” (Jaffe 2010). As the staff writer points out, the current situation in the war zones only expose the pilots of manned aircraft to minimal levels of risk as well and yet the difference in recognition levels between the manned aircraft crews and those of remotely piloted aircraft remains great.

Another similar situation occurred in the mountains of Afghanistan in 2002. The commander of a Predator squadron unsuccessfully nominated several airmen for the Distinguished Flying Cross following a mission which, in the words of the joint terminal attack controller on the ground, “[the Army Ranger platoon] would have all died without the Predator” (Jaffe 2010). The Predator leadership seems to understand that a new dynamic exists and their overall aim seeks to simply give due credit. As of early 2010, the senior leadership still had not “come up with a way to recognize the Predator’s contributions in Afghanistan and Iraq. „There is no valor in flying a remotely piloted aircraft. I get it,” said Col Luther “Trey” Turner, a former fighter pilot who has flown Predators since 2003. „But there needs to be an award to recognize crews for combat missions” (Jaffe 2010).

General Norman Schwartz, the current Chief of Staff of the Air Force, continues striving to change this dichotomy. He personally attended the graduation of the first class of unmanned aircraft pilots that did not have previous flying experience in September 2009. General Schwartz officially labeled them as pilots and “even though they didn’t



leave the ground, they would receive flight pay” (Jaffe 2010). The image below depicts the newly created wings that General Schwartz awarded this new generation of Air Force pilots. Finally, General Schwartz sent a major statement on Christmas day in 2008 when he spent his holiday with the men and women at Creech Air Force Base, the primary location for the aircrew flying Predator and Reaper aircraft (Moore 2008). Historically, senior military leaders spend holidays with troops in combat zones, so the decision to visit airmen “engaged in combat” but not in a “combat zone” signified a tangible shift in the understanding of the term “combatant.”



Figure 2. Unmanned Aircraft Operator Wings

*Source:* United States Air Force, UAS Wings, <http://www.af.mil/shared/media/photodb/photos/090930-F-1001M-001.JPG> (accessed 7 April 2011).

All of the discussion above lays out the intricacies that the introduction of unmanned warfare imparted to this newest generation of combatants. The resulting effect ultimately stems from the unique nature of fighting a war while continuing to lead a

normal life. In Lieutenant Colonel Martin's words, it is hard to conceive how these men and women "commute to work in rush-hour traffic, slip into a seat in front of a bank of computers, „fly“ a warplane to shoot missiles at an enemy thousands of miles away, and then pick up the kids from school or a gallon of milk at the grocery store on the way home for dinner" (Martin 2010, 2). This second order effect results in numerous third order effects.

When a remote operator finishes a "shift," they rapidly transition back into their civilian life leaving them significantly less time to properly cope with the stresses of combat previously highlighted. In a typical war time environment, a soldier, sailor, or airman gains the advantage of having time during the simple tasks of life such as eating chow, walking back to the bunks, and lying in bed at night to talk with individuals living through the same life experience. On top of this, the complexity of close interpersonal relationships with wives, children, and close friends adds another dynamic to the equation. Throughout his book, Lieutenant Colonel Martin references the difficulty he experienced following combat experiences where he did not feel ready to "discuss the details of what [he] did" and finishes his book saying "one day, maybe" (Martin 2010, 306). Arguably one of the leading experts in the field, defense analyst Peter Singer further supported the impacts of this dynamic in an interview with Spiegel Online in March 2010. Singer said that the results of his research "found significantly increased fatigue, emotional exhaustion, and burnout" within the remote pilot ranks and that "drone operators are more likely to suffer impaired domestic relationships" (Pitzke 2010b). Ironically, in successfully meeting the objective of creating a method of fighting war where the combatants do not deploy, today's military now faces not only unique and

emerging issues, but also unknown issues that must be uncovered, understood, and mitigated.

The unique byproducts of unmanned warfare do not stop with the operators. By distancing combatants to the point that they now fight from the same location where they live their civilian lives, the center of gravity and the targets required to be attacked by an enemy, namely the operators of the unmanned combat vehicles, reside squarely in the middle of the United States civilian population. Ironically, having soldiers who historically “went” to war provided a certain shield for the rest of a society from the horrors of war; however, through the advances in technology, the distancing of combatants from the battlefield has brought the risks of war back to the civilian population centers. Not that this concept is entirely new, from the ball bearing factories in Germany during World War II to the barns used to store cotton destroyed in Sherman’s march to the sea, aspects of this concept have been around to some extent for most of recorded history. The striking difference here lies in the fact that the actual combatant, the person pulling the trigger and killing enemy soldiers, no longer resides on the front lines of a war, but instead, in the townhouse next door. One United States Air Force officer voiced his concern in a paper written for the Naval War College that “in this age of technological miracles, war by default could inadvertently move to our own front doorstep” (Roach 2008, 15).

At the end of 2010, three locations within the United States provided remote operating locations for active duty military operators of unmanned combat platforms: Creech Air Force Base near Las Vegas Nevada, Holloman Air Force Base north of El Paso Texas, and Cannon Air Force Base near Clovis New Mexico (Rolfsen 2010).

Additionally, the state Air National Guard units operate remotely piloted aircraft from five locations: (1) March Air Force Base east of Los Angeles, California; (2) Tucson, Arizona; (3) Houston, Texas; (4) Fargo, North Dakota; and (5) Syracuse, New York (Air National Guard 2011). By early 2011, the United States Air Force plans to have remotely piloted aircraft operating out of Whiteman Air Force Base, Missouri, and by early 2012 another operational location at Ellsworth Air Force Base, South Dakota (Rolfsen 2010). The unique capability of unmanned assets literally allows them to be operated from anywhere that can support the infrastructure requirements. One can generally understand the benefits of removing the operators out of harm's way; however, each of these individuals being removed from the battlefield still constitute a legal combatant, only now they are spread across the United States. In a mere ten years, the United States has gone from having no actual trigger pullers operating within the national borders to the current situation where by 2012 ten of the fifty states will host unmanned combat operators. Somewhat sobering is the realization that twenty percent of the states within the United States will have active wartime combatants living inside their borders.

The introduction of coalition partnerships and foreign pilots further complicates this effect of unmanned warfare. The United Kingdom deployed their first MQ-9 Reaper in June 2008 (Evans and Norton-Taylor 2010). Combined crews of British and American operators launch the aircraft from locations within Afghanistan and then hand off control to British pilots and sensor operators stationed at the 39th squadron, a Royal Air Force unit located at Creech Air Force Base, Nevada (Law 2008). Although coalition operations seek to align control under the authority of one combatant commander, individual national concerns and specific rules of engagement create their own set of second and

third order effects blurring the lines set by national level policy makers. In his book, Lieutenant Colonel Martin describes one instance in which a British crew controlled a Predator aircraft during the identification of a target all the way through the target being declared hostile. Then, apparently due to concerns from the British operator, an American crew took the controls to actually fire the weapon which killed four Taliban fighters (Martin 2010, 285). This example combined with the fact that British personnel are actively engaged in combat operations from within the United States, a completely new concept in and of itself, highlights the fact that many effects from the introduction of unmanned warfare may not be known fully for many years to come.

In addition to the impacts on the primary operators of remote systems, several additional effects emerge from the fact that the enemies of the United States fight a faceless foe that warrant at least a brief inclusion in this discussion. A recent Jane's Intelligence Review article asserts that "jihadists have used the drone strikes as justification for an unprecedented campaign of violence in Pakistan under which thousands of civilians have been killed in terrorist attacks since 2008" (Sloggett 2010). Similarly, evidence suggests that violent sects within the Islamic communities utilize buzzwords directed at the use of unmanned aerial vehicles such as cowardly, coldhearted, and weak to incite anger and provide unity for their cause (Singer 2010b). These effects appear to have been somewhat minimal throughout the conflict in and around Afghanistan so far; however, the trend over the past two years, from 2008 to 2010, show a rise in the use of remote warfare, increasing the likelihood that more of these presently limited effects may emerge in the future.

### Detailed Summary of Effect

The introduction of the capability to conduct direct combat operations from geographical locations far removed from a warzone has changed the concept of a combatant on a fundamental level. The United States Air Force struggled to classify this new breed of warrior for a majority of the first decade in the twenty first century. The combatants remotely operating combat vehicles in today's military represent a shift in the historical construct of a warrior. These combatants do not "go to war"; instead they bring the war back to them through the use of satellites and current communication capabilities. This disconnection with the actual battlefield and the risks associated therein modifies the "definition of the attributes soldiers must have when they go to war, most especially that ultimate value that so defines a soldier, courage in the face of danger" (Singer 2009a, 331). However, this fact does not mean that operators of unmanned combat vehicles avoid the horrors of war. On the contrary, this new generation of combatant typically sees first hand, and in real time, many of the results of warfare previously unseen. These could range anywhere from watching helplessly as enemy forces overrun and kill friendly soldiers to observing a second car bomb going off in a crowded market shortly after responding emergency personnel arrive. New and unique stressors develop within the remote operators due to the capabilities provided by unmanned assets and these issues must be first understood and then dealt with to mitigate the effects.

Along with these effects on the individual operators, the nation as a whole continues to see more and more second and third order effects from unmanned warfare. The use of remote operations from a vast array of locations throughout the homeland poses new threats to the civilian population, especially within the construct of major

combat operations with another major world power. As the proliferation of unmanned combat vehicles continues to increase, more and more legal combatants and lawful wartime targets sleep every night inside the neighborhoods throughout the country. Furthermore, the introduction of combatants from another country conducting actual lethal combat operations from within the borders of the United States fundamentally alters the traditional concept of going to war. In the end, the introduction of unmanned warfare and the subsequent reduction of direct risk to soldiers on the battlefield create a change in the nature of combatants such that it must be accompanied by an increase in security measures for both the stateside combatants as well as the civilian population of the United States.

#### Effect Applied to the Battlefield

Two specific scenarios capture the essence of this unintended consequence where unmanned warfare changes the nature of combatants. The first example stems from utilizing the capabilities provided by the use of remote-split operations allowing the pilots and sensor operators of remotely piloted aircraft to engage in both combat operations and the local parent teachers' association event, or any otherwise normal civilian activity, in the same day. The other scenario highlights some potential issues with coalition activities when combined with the use of unmanned combat capabilities.

A majority of the academic work discussing the status of Predator and Reaper operators classify them as both legal combatants and lawful targets. When you inject these individuals throughout a community located near the installations where the United States military conducts remote combat operations, many civilians become intermingled with the combat forces actively engaged in combat. The inherent risk which once resided

with the military members who had gone to war transfers to locations within the United States. Based on the complex nature of this unique dynamic, one could potentially claim that the United States shelters its combatants within the civilian population. Despite the legitimacy of such a claim, an enemy force capable of striking multiple legal targets within the neighborhoods of a major city within the United States could justify a rationale for these acts which would otherwise be considered acts of terror. A contemporary example of this in 2011 might include operations conducted by personnel loyal to Colonel Muammar Gaddafi's government. Such an attack would certainly incite some heated debate over the current conduct of military combat operations.

Blurring the lines of combatants occurs between military members of different nations as well. Take the example given earlier where an American crew simply took the controls of a Predator from a British crew for the final portion of the kill chain. Although this might technically satisfy certain rules of engagement restrictions, the intent seems to be somewhat misaligned. An even more intriguing dilemma presents itself if one considers potential war crimes. Would new items need to be addressed in status of forces agreements limiting the culpability of United Kingdom citizens engaged in combat operations from the United States? Ultimately, the United States and its allies can solve these issues of second and third order effects from unmanned warfare with the application of current policies and procedures as well as strong leadership involvement. However, with the rapid pace of technological change, each new capability emerges more rapidly than the last and the end result may be an inability to mitigate the negative effects faster than new ones develop.



### Policy Lag

Throughout history, the fundamental nature of warfare created a strong linkage between politics and war. Carl Von Clausewitz famously captured this concept as war being an extension of politics (Clausewitz 1976, 87). It therefore follows that the lack of a solid political framework or foundation concerning a particular “means” of waging war produces an environment where military decision makers lack the appropriate guidance to determine when, where, and how to use a particular capability, in this case, unmanned warfare. In the United States, where civilian leadership maintains overall control of the armed forces, the formulation of policies accounts for a significant portion of the control mechanisms for the military.

However, in the case of unmanned warfare, the technology making this method of warfare possible developed relatively expeditiously creating a situation where a new means of fighting war emerged more rapidly than the political establishment’s ability to decide on policy. This thesis captures this lagging or reactionary method of introducing the supporting policies governing the use of a new technology by the concept “policy lag.” The idea of policy lag could extend to numerous different areas of study; however, for the purpose of this research, the connection between civilian leadership and military decision makers will be the focus. The second order effect of policy lag stemming from the rapid fielding of a new capability is not unique to the unmanned warfare environment; however, with the speed of change in the current world, particularly in the unmanned vehicle and robotic sectors, this effect warrants inclusion in this discussion.

The particular timeframe useful in highlighting this effect begins in the late summer to early fall of 2000 and lasts until shortly after 11 September the following year.

Three specific areas of concern develop over this period of time directly related to either the lack of a policy, or at most a weak, underdeveloped policy where nebulous situations emerged. The initial issue surfaced when the first unarmed Predators arrived over Afghanistan on 7 September 2000 (United States Government n.d., 189) and resulted from the decision to utilize the relatively new platform strictly in an intelligence collection capacity rather than a real time cuing system for other lethal combat assets. Next, the question of when, where, and how often to use this secretive platform following the lull in operations during the winter months of 2000 to 2001 created significant debates at the senior levels of government. Finally, the question of who possessed both the best capability and the legal right to operate the newly armed Predator, the military or Central Intelligence Agency, remained unanswered prior to 11 September 2001. Looking into these three indicators of a weak or lacking policy at the senior levels of government provides a clear picture of the policy lag during the transition from the unarmed Predator aircraft to the armed version.

### Comprehensive Summary of Data

A number of factors played a role in the emergence of a lagging policy during the early stages of incorporating the capability of an armed unmanned aerial vehicle. In looking at the resources available, the primary sources providing such insight reside heavily in the congressional testimony given during a hearing conducted by the National Commission on Terrorist Attacks Upon the United States conducted on Wednesday, 24 March 2004. In addition to these testimonies, the 9/11 Commission Report both summarizes the major concepts developed through their research and makes reference to a number of other testimonies and articles in the endnotes that provide additional

information regarding the early policies regarding the Predator aircraft. Two of the most telling testimonies came from the director of the Central Intelligence Agency, George Tenet, and Richard Clarke, the former National Coordinator for Counterterrorism for National Security Council. Clarke stated that he “realized that this policy process was going to take forever” and questioned the lack of an ability to separate the policy relating to arming the Predator from the overall national security presidential directive during the summer of 2001 (Holbein 2005, 330). Deputy Secretary of State Richard Armitage did not agree that eight months was an “inordinately long time” to develop the policies published in the National Security Presidential Directive dealing with counterterrorism published on 4 September 2001. However, in his testimony to congress, Armitage struck a major concept in the changing nature of policy development, specifically when dealing with rapidly emerging capabilities, when he quoted Samuel Clemens statement “that even though you’re on the right track you can get run over if you’re not going fast enough.” He felt that in hindsight they “weren’t going fast enough” (Holbein 2005, 351).

The staff statement that summarized the intelligence policy, written following these testimonies, details a recurring conflict between Clarke and Tenet concerning many facets of the Predator program. At the request of President Clinton in early 2000, Clarke worked with the Assistant Director of Central Intelligence for Collection Charles Allen and Vice Admiral Scott Fry of the Joint Staff to provide a solution for the lack of real time intelligence in Afghanistan (Holbein 2005, 531). As a result, the option of flying the unmanned Predator aircraft over Afghanistan emerged in the hopes of providing real time video that could “boost U.S. knowledge of al Qaeda or be used to kill Bin Laden with a cruise missile” (Holbein 2005, 531). However, to implement this option, several policy

questions needed to be addressed including funding, strike authority against fleeting targets, and how much to use these new assets at the risk of losing the elements of secrecy and surprise. Each of these policy issues continued to grow and become more dynamic during the transition to an armed version of the Predator throughout the following year and a half.

As depicted in figure 2, the Department of Defense funding for unmanned aircraft systems remained relatively low in the spring of 2000 leading to serious questions as to who would pay for the Predator operations in Afghanistan. The Department of Defense owned the current program, but the Central Intelligence Agency would be responsible for conducting the operations. Ultimately the White House imposed a “cost-sharing agreement” where the Central Intelligence Agency paid \$2 million and the Department of Defense picked up the remaining \$2.4 million to fund 60 days of trial flights in the fall of 2000 (United States Government n.d., 506). This simple example highlights the confusion in responsibility between the various government agencies as they related to the new Predator aircraft and the reactive posture of the White house in implementing policy regarding the funding of these new operations. This same trend of a reactive implementation of policy emerged in the area of strike authority, specifically as related to who could authorize a strike and which agencies could operate the platform executing the lethal force.

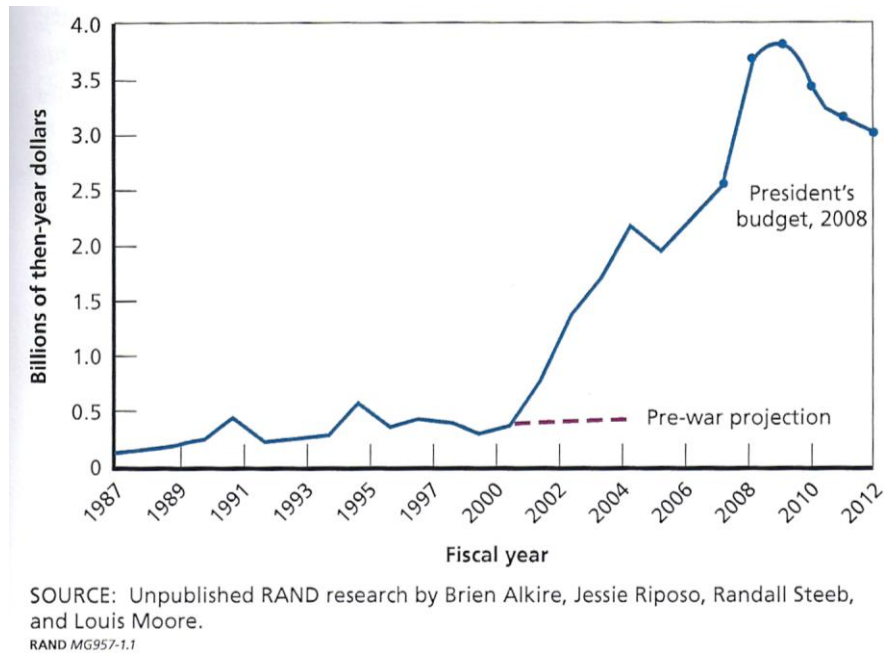


Figure 3. Department of Defense Investment in Unmanned Aircraft Systems  
Source: Brien Alkire et al., *Applications for Navy Unmanned Aircraft Systems* (Santa Monica, CA: RAND Corporation, 2010), 1.

As the technology continued to develop, the capabilities of the Predator began to stretch the current policies regarding strike authority of fleeting targets. Even with the unmanned version being introduced in the fall of 2000, Richard Clarke’s deputy, Roger Cressey, sent a memorandum to one of President Clinton’s security advisors stating that “principals committee meetings might be needed to act on video coming in from the Predator if it proved able to lock in Bin Laden’s location” (United States Government n.d., 189). George Tenet echoed this concern in his written statement during the 9/11 Commission hearings saying “one of the most difficult issues would be developing a command and control arrangement that could respond to fleeting opportunities while ensuring the right level of leadership control over the operation” (Holbein 2005, 461). During May and June of 2001 two exercises sought to flush out many of the operational

and policy questions that would come along with the implementation of the armed Predator. Two particularly telling questions that Tenet mentioned in his statement dealt with what criteria would be used to shoot and “who authorizes weapons firing” (Holbein 2005, 462). These questions arise in other operations as well; however, the fielding of an armed Predator under the direct control of the Central Intelligence Agency certainly complicated the issue.

The various pieces of information capturing the discussions surrounding the issue of having an agency other than the military operate an armed aircraft lay out several different opinions on whether the Central Intelligence Agency supported this concept prior to 11 September 2001. George Tenet wrote that they were working with the Air Force to arm the Predator as well as working on “developing the enabling policy and legal framework” to achieve a capability to “promptly respond to future sightings of high value targets” (Holbein 2005, 461). Although this support appeared to come with reservations and Richard Clarke testified to congress that Tenet, in a principals committee meeting on 4 September 2001, did not view it as the Central Intelligence Agency’s “job to fly armed Unmanned Aerial Vehicles” and that he did not “want to fly the armed Predator under their authority” (Holbein 2005, 341). In any event, the policies regarding the command and control structures to be used for an armed Predator mission were not in place as of 4 September 2001 despite the fact that the concept had been around for several years. At the conclusion of the principal’s meeting on 4 September 2001, Condoleezza Rice summarized the Predator discussion stating that the armed Predator “was needed but not ready,” that the military would consider using the Predator “along with its other options,” and “the Central Intelligence Agency should consider

flying reconnaissance-only missions” (United States Government n.d., 214). An interesting conclusion considering the fact that an armed Predator aircraft flew in Afghan airspace a little over a month later.

#### Detailed Summary of Effect

The information presented above paints a clear picture of the lack of a comprehensive forward looking policy toward the fielding of an armed unmanned aerial vehicle during the year and a half period of time leading up to this new capability. Ultimately, the policy lag created a situation where the capabilities to incorporate the unmanned platform into a direct attack role developed more rapidly than the current practices for defining policies within the government. Many factors influenced this fact, but the most important aspect when looking at the reactionary nature of the policy makers focuses in on the rapid development allowed by the emerging technology.

The idea of using an armed unmanned platform did not emerge overnight, but when compared to the typical acquisition timeline of new capabilities capable of changing the fundamental nature of combat on this magnitude, it seems like the rapid transition to an armed version of the Predator outpaced most expectations of government officials. Air Force General John Jumper commented that the pace of the armed Predator program seemed unmatched “in the modern era, since the 1980s” and that he “would be shocked if you found anything that went faster than this” (United States Government n.d., 212). Following the attacks on 11 September 2001, the United States rapidly fielded the armed Predator into an environment that not only lacked a clear delineation of the command and control framework, but one where there existed no direct policy on who, when, where, and how to use this new asset. Military commanders can and do fill in the

blanks in a situation like this, however, with the current trend of rapid technology development, a more forward looking approach in which policy makers address the questions faster than technological achievements occur will minimize the holes needing to be filled in.

### Effect Applied to the Battlefield

Policy lag developed during the transition from an unarmed to an armed version of the Predator aircraft. The importance of highlighting this effect essentially lives in the nature of the twenty first century world where processes currently developed struggle to maintain pace with the changes technology brings forth. As such, applying the effects of policy lag to the Afghan battlefield during this transition period fulfills the goals of this thesis more effectively than applying this effect during a time following the implementation of the armed Predator. Specifically, the policies certainly lagged behind the capabilities of the unarmed Predator being used as a reconnaissance aircraft in the fall of 2000 and sheds light specifically on the dangers of a reactionary nature when setting policy.

George Tenet stated in his written testimony to congress that Osama bin Laden may have been spotted by Predator aircraft on two separate occasions during their proof of concept missions between September and December 2000 (Holbein 2005, 461). The National Security Council had not laid out a policy to synchronize the capabilities inherent with this emerging capability across the different governmental agencies. As a result, no action was taken. According to Richard Clarke, at the Central Intelligence Agency's request, no covert or military assets could be cued to respond to an emerging high value target spotted by the unmanned aircraft (Holbein 2005, 494). A better



understanding of the capabilities that the new unmanned platform provided at the top levels of government along with a coordinating policy laying out a methodology capable of answering the legal and strike authority questions raised by this new method of warfare may have provided the framework necessary to prosecute an attack on one of America's most wanted terrorists. Although hindsight often provides a clearer understanding of a situation, the increasing automation developing throughout the technology sectors provide this scenario potential to present itself again in the future.

#### Persistence: Shifting the Roles of the Primary Battlefield Observer

The persistence provided by unmanned aerial vehicles created a shifting in the roles played by the soldier on the ground and the assets looking down on a battlefield from the air. Historically, aircraft have presented the limiting time factor as they pertain to the collection of intelligence on the battlefield. Due to fuel limitations, pilot fatigue, and risk involved in extended operations in one location, the soldier on the ground typically saw numerous aircraft enter and leave their area of operations during a mission. As such, this soldier became the continuity on the battlefield and used their situational awareness to build that of the new aircrew when they arrived. This dynamic shifted on the battlefield in Afghanistan for several reasons. First, the crews of the unmanned aerial vehicles have the ability to "fly" non-stop for eight to ten hours over a target area. Additionally, if desired or required, the same two or three unmanned combat vehicle crews have the ability to cover a target area indefinitely. Now, as soldiers move from objective to objective, the "unblinking eye in the sky" maintains the capability to gather a high level of situational awareness over a particular area and pass the base of knowledge

along to new soldiers as they enter (Singer 2009a, 222). The information can range from known or suspected sniper or ambush locations, historical weapons cache sites, or even something as simple as the color, make, and model of the local tribal leader's sedan. The shift to airborne battlefield observers resulting from the capability to maintain twenty-four hour persistence over the battlefield seems to have an increased incidence in Afghanistan due to the vast distances and remote locations throughout the country.

Many of the predictions for warfare in the early twenty first century, to include that of the United States Army (Headquarters, Department of the Army 2009, 9), support a trend that will place soldiers across the globe to fight in many different urban settings to disrupt the sanctuaries of terrorists. This scenario creates an even larger expanse of great distances and remote locations than those seen in Afghanistan, leading to the likelihood of a shift in battlefield observer roles being seen more and more in future combat scenarios. However, one major issue with a shift toward relying on an airborne asset to provide the preponderance of intelligence in an area stems from the limited fidelity and a lack of personal relationships with the local population. The unmanned aerial vehicles researched in this thesis cannot replicate the ability of a soldier on the ground to perceive minor body language cues and develop a "feel" for a situation. The parallel processing of the human mind provides the ability to collect and understand an enormous amount of data and merge it into useful information. From the sights, sounds, and smells of a situation, many details come to light based not only on the known parameters that caused an effect, but also the subconscious cues pulled into the bigger picture by the mind.

## Comprehensive Summary of Data

The shift in battlefield observation as described above presents itself through the two specific areas of short term direct observation and long term development of situational awareness or patterns of life within a specific area. Combined, these two aspects provide the foundation enabling the operators of remotely piloted aircraft the ability to gain immense amounts of information regarding the situation on the ground. However, after developing an understanding of these two areas of interest, one needs to also understand the inherent limitations created by this emerging capability. The body of knowledge captured over the past decade provides a number of telling examples shedding light on this effect.

The short term direct observation provided by unmanned combat vehicles proves a logical starting place to begin looking at the data concerning this effect. Without overcomplicating the concept, the Predator and Reaper aircraft's ability to provide lethal persistent observation likens them to a sniper of sorts. However, this sniper can position anywhere in the three dimensional battlespace, move hundreds of miles with relative ease, and often remain unheard and unseen while maintaining an extremely high level of patience. Predator pilot Lieutenant Colonel Martin described this concept quite well.

Predator was the perfect air-cover weapon. It could remain in the air for a full day and night hunting or staring at a target. When it came time for it to go home and refuel, another Predator took its place. It was the same with the operators. We had unlimited patience. We were always present over the war front, watching, waiting. (Martin 2010, 29)

Lieutenant Colonel Martin refers to this concept often throughout his book with one specifically telling event when some insurgency leaders failed to protect their electronic communications and "became careless over time" (Martin 2010, 290). The Combined

Joint Special Operations Task Force in Afghanistan gained intelligence on the location of a Taliban leader near Kabul and requested Predator support. The individual was inside a house surrounded by women and children so the aircraft patiently monitored the area for several hours until two men walked out of the house and to a nearby field. Subsequent signals intelligence confirmed the target's identity and since "Predator in Afghanistan was now packing iron," a hellfire missile completed the kill chain less than a minute later (Martin 2010, 291).

Author Robert D. Kaplan addresses this concept in his book *Hog Pilots, Blue Water Grunts* after being embedded with the remotely piloted aircraft squadrons near Las Vegas, Nevada. He stated that watching a Predator crew at work in their ground control station "was like going on a reconnaissance mission with a sniper unit, except that the boredom was not made worse by heat or cold, or by the need to hide behind a rock" (Kaplan 2007, 333). Often, the benefit of being able to conduct airborne operations more effectively from one G and zero knots as opposed to actually being in the aircraft makes its way into the discussion concerning the advantages of unmanned platforms. In actuality, this capability for the pilot and sensor operator of an aircraft overhead a battlefield to remain on station for hours on end provides much more than just the ability to operate without being under the influence of strenuous physiological factors. Kaplan describes how Predator crews become "part of the tactical element" and provide the capability to follow a vehicle of interest "which might then establish who and what the vehicle was linking up with, and consequently follow it, leading perhaps to another stakeout and an eventual raid that the pilot and sensor in Las Vegas could arrange" (Kaplan 2007, 333). Conducting this type of hand off may take anywhere from a few

hours to several days or weeks. During this time, the unmanned aircraft operators become the individuals with the greatest degree of firsthand knowledge of the rapidly changing tactical situation on the ground. Additionally, these observers have the ability to pass this information to the assault force performing the actual raid on the ground. This scenario shows the impact that persistence brings to a battlefield in the short term direct observation role, but even greater impacts in Afghanistan emerge from the capability to build long term situational awareness of specific areas within a particular region.

The main concept surrounding the long term observation of the battlefield centers around two main points: the continuous engagement in combat operations and the capability to remain on a surveillance mission for weeks on end. First, the pilots and sensor operators of unmanned aircraft of today do not have to deploy to conduct their mission. Therefore, they do not go in and out of combat status and rather than the typical Air Force pilot cycle of “sixteen months of training followed by four months of deployment,” the Predator squadrons instead engage in “twenty months of combat” (Kaplan 2007, 331). This continuity alone contributes significantly to an increase in long term situational awareness capable of providing high levels of local understanding.

Author and defense analyst Peter Singer references several discussions with Predator pilots highlighting this effect.

This ability to “dwell and stare,” as one Predator pilot described, means that the unit can get a sense of the area and “see things develop over time.” Another describes how by watching from above, units can build up a sense of what is normal or not in a neighborhood, much the way a policeman gradually gets to know his beat. (Singer 2009a, 222)

Along with this long term deployed in place status, the pilots and sensor operators of unmanned platforms experience what Major Bryan Callahan, a former F-16 pilot,

describes as “very different” when you “drop yourself into an airplane that’s already airborne and on target on the other side of the world” (Pitzke 2010a). Major Callahan goes on to describe flying manned fighters as “a very finite execution” where a pilot executes a particular mission for a few hours, debriefs, and then moves on to the next. In contrast, a remotely piloted aircraft crew “may very well be working that operation for weeks” (Pitzke 2010a).

The combination of both the long term engagement in combat and the persistence capability during specific operations created what Kaplan describes as crews who “knew the telltale signs of an improvised explosive device, the wadis and other egresses, the entrances to the mud-walled compounds, the look of an Afghan „jingle“ truck, and so on” (Kaplan 2007, 331-332). Air Force Lieutenant Colonel Matt Martin perhaps captures the truly unique nature brought about by the arming of unmanned aircraft when he explains this combination as “the unblinking eye of a remote presence and the rapid response capability of a kill chain that never quit” (Martin 2010, 219). This incredible capability however, does not come without its own limitations.

The simple concept of courage within a fighting force elicits debate over the trend that seems to be shifting more battlefield observation duties to airmen stationed within the United States. In his book *Wired for War*, Singer references a discussion with a marine general alluding to the fact that courage and “personal bravery, which you cannot do with a robot, builds trust and alliance in a way that money or power never can” (Singer 2009a, 308). As technology provides increasing capabilities to conduct observation without maintaining a presence on the ground, the threat becomes a reduction in the direct impact provided by personal relationships built with those effected by the

combat operations as well as the capability to get a feel for a situation. This factor ties back directly with the changing nature of combatants in some interesting ways.

An interview conducted between Peter Singer and an air force officer provides one specific example that stands out. The air force officer describes how “being there virtually only allows so much communication” and how this presents issues when needing to execute operations rapidly. He goes on to explain how the information flow is sometimes “too late,” but if they were able to “just talk face-to-face, where body stance and seriousness are so clear, it would [only] take a few seconds” (Singer 2009a, 337). In short, the fog of war still presents many issues to the combatants in modern conflicts. Kaplan captures this concept first hand in a quote from another remotely piloted aircraft pilot that said, “we’re in the thick of these ground missions, and as a result we’re just as confused as anyone sometimes” (Kaplan 2007, 336).

#### Detailed Summary of Effect

Modern technology connects combatants to the current battlefield in such a manner that allows persistent observation in ways which were previously impossible. This capability modifies the relationship between those fighting on the ground and the individuals capable of maintaining certain forms of situational awareness within a battlefield environment. The effect of this shift in combat dynamics, due to the unique nature of persistent observation and persistent strike provided by remotely piloted aircraft, results in the aircrews stationed within the United States emerging as a new resource to conduct primary battlefield observation. Based on the current trend of global hot spots becoming the norm, the persistent nature of unmanned warfare generates unique opportunities stemming from an ability to maintain continuity both over a long term

period of several years as well as during individual operations lasting days, weeks, or even months. As a result, the pilots and sensor operators of unmanned aircraft become the primary battlefield observers in certain circumstances.

Two main driving factors make up the foundation creating this effect. First, these pilots and sensor operators usually stay in an active combatant role much longer than the typical aircrew. Second, remotely piloted aircraft allow the unique capability to provide a continuous eye in the sky throughout an entire operation spanning multiple areas of operation. Within the Afghan operational environment, this effect appears to be amplified due to the vast remote areas causing control of the land a more difficult task. With that said, the operators of unmanned assets cannot replace certain aspects of battlefield observation such as picking up specific facial cues and other items caught by the subconscious mind by the human brain. Finally, when properly understood, this shift in roles merges the current observation capabilities present on today's battlefield creating a synergistic effect that allows rapid dissemination of information to the war fighter on the ground.

### Effect Applied to the Battlefield

Of all the second and third order effects created by the introduction of armed unmanned assets, the introduction of a persistent observer with the capability to close the loop on the kill chain emerges as one of the most intriguing. This effect did not originate as an intentional one, but can impact the battlefield greatly. Take for example, the situation where the pilot and sensor operator begin their operations during the initial air offensives into a hostile area. The crew operates in eight to ten hour shifts every day while having a day off every one or two weeks. Combined with two other primary



aircrews, these airmen begin to build situational awareness of a particular region such as the major lines of communication available, the typical amount of activity in the local markets on Saturday mornings, and the presence of numerous unexplainable heat signatures throughout certain areas of an otherwise uninhabited forest.

The above examples only account for a small sampling of the potential this new persistent observer brings to the fight, but should prove sufficient to understand the effects brought about by adding this capability to the military force. Following the initial shaping efforts on the battlefield which might last several weeks or more, these airmen remain an integral piece of the military force within an area. In this scenario, as the ground forces move into the battlespace, a properly integrated Predator or Reaper crew maintains the capability to pass critical firsthand knowledge of the major lines of communications to include areas where traffic typically bottlenecks within a city or possibly some previously unexpected avenues of approach for an enemy force.

For the next example in this scenario, due to their familiarity with the area, the remotely piloted aircraft sensor operators might notice a significantly reduced amount of activity within the city's market as the units following the ground force main effort move into the area. If synchronized and passed to the appropriate personnel on the ground, this information combined with additional intelligence could yield the necessary warning signs of an impending counterattack. Additionally, once a counterattack begins and enemy mortars begin firing from the previously described forest, a pilot and sensor operator already familiar with the operating area can rapidly coordinate with the ground commander to gain approval for an immediate attack on the enemy position.

Certainly, the events described above do not show a picture where operators of aircraft will replace the battlefield observation from ground personnel. Rather, they depict how the primary battlefield observers with the best situational awareness in certain situations may in fact be these airmen physically located thousands of miles away from the actual combat zone. Their distance from the front lines does not alter the fact that these pilots and sensor operators can provide continuity for ground forces as they move throughout the battlespace. As a final thought, these airmen have the potential to remain integrated into the combat force within this particular region in some manner for many years following the events described above, a truly amazing fact indeed.

#### Relaxed Use of the Military Instrument of National Power

The fielding of military capabilities allowing war fighters to engage in combat with lethal force throughout the entire world from a safe and secure location far removed from the battlefield throws a new twist in the age old cost versus benefit analysis. Human decision making weighs the costs and benefits of virtually any action being taken and the intricacies levied on the cost-benefit ratio by the introduction of unmanned warfare produce far reaching effects. At the basic level, unmanned warfare changes both sides of this equation simultaneously by lowering the perceived costs of war while increasing the ability to provide more benefits to specific situations. Combined, these factors possess the ability to change the balance of foreign policy decisions resulting in a “dark irony” where in an attempt “to lower the human costs of war,” utilization of unmanned combat platforms may very well “seduce [the United States] into more wars” (Singer 2009a, 322).

This concept of a relaxed use of military force at the conceptual level appears throughout many discussion forums as well as in the remarks by many intellectuals and former government policy makers. Simply put, reducing the overall risk to American military forces lowers the perceived cost of using military action to influence a situation in terms of lives lost and loved ones not returning from a war. Additionally, some of the highest direct costs of war in terms of time and money come from the loss of years and years of training every time a manned asset gets destroyed. On the contrary, the loss of a Predator aircraft costs a clean \$4 million and the operator with ten or twenty years of experience can simply reset the computer connections and take control of a new aircraft. This example greatly simplifies the actual situation, but points out the fact that the human component within the military resides as the most important and difficult to replace in a war time situation. Ultimately, unmanned assets reduce the overall amount of military capacity put into a hostile environment by keeping human operators out of harm's way.

The capability to provide persistent observation and persistent strike emerges as another byproduct of removing the human element from the actual combat platform. The inherent benefits gained by significant increases in endurance of airborne assets as described previously in this thesis make a successful outcome more likely, and this capability can now be employed across the entire globe. Furthermore, the current world environment sees a situation where the United States and its allies wield a significant technological advantage that creates a high level of confidence within many civilian and military leaders. The perception of an increase in benefit, along with the reduced costs needed to achieve this benefit, factor directly back into the analysis determining when,

where, and how military force fits into the overall foreign policy stance of the United States.

### Comprehensive Summary of Data

Understanding the vast complexities behind a potential relaxed use of the military instrument of national power requires careful examination of virtually every aspect of the national government. However, when looking at this high level of government, establishing the true nature of many cause and effect relationships becomes difficult at best and potentially misleading at times. In order to simplify this issue, focusing specifically on the observed data stemming from the Afghan operational environment and then cross referencing comments and opinions from some of the leading experts allows one to form a basic understanding of this principle in action. The lightly governed area of Pakistan along the border with Afghanistan provides a particularly useful area to narrow in on as it shows many of the dynamics specific to the use of unmanned combat platforms within a confined region. Peter Bergin and Katherine Tiedemann provide some telling insight into the significant use of remotely piloted aircraft in this region in the opening statements of their recent article published in December 2010. “In the first 11-and-a-half months of 2010, U.S. President Barack Obama’s administration authorized more than twice as many drone strikes, 113, in northwest Pakistan as it did in 2009—itsself a year in which there were more drone strikes than during George W. Bush’s entire time in office.” (Bergen and Tiedemann 2010)

While the relationship between the United States and Pakistan becomes stressed at times, they generally consider each other allies in a fight against a common enemy in the war on terrorism. This enemy travels across international borders creating a sort of

sanctuary along the tribal region between Afghanistan and Pakistan. As a result, the United States military and North Atlantic Treaty Organization forces face a dilemma where they need to conduct combat operations within the territory of Pakistan to influence the fight going on in Afghanistan. To deal with this issue, Secretary of Defense Donald Rumsfeld considered potential plans to conduct operations inside Pakistan in an attempt to capture high level Al Qaeda leaders but “wanted to tread cautiously in Pakistan for fear of undermining” senior leadership within their government (Shah 2008). In fact, “the first publicly acknowledged case of United States forces conducting a ground raid on Pakistani soil” in September 2008 resulted in a “strong protest” from the Pakistani government with their military spokesman, Major General Ather Abbas, stating that they “reserved the right of „self defense and retaliation“” (Shah 2008). While no actual conflict with Pakistan resulted, this reaction to actual United States soldiers conducting combat operations within Pakistan seems telling in itself. Even the title of the *New York Times* article, “American forces attack militants on Pakistani soil,” appears to be disconnected with the fact shown in the figure below that Predator aircraft, flown by “American forces” previously attacked inside Pakistan on numerous occasions.

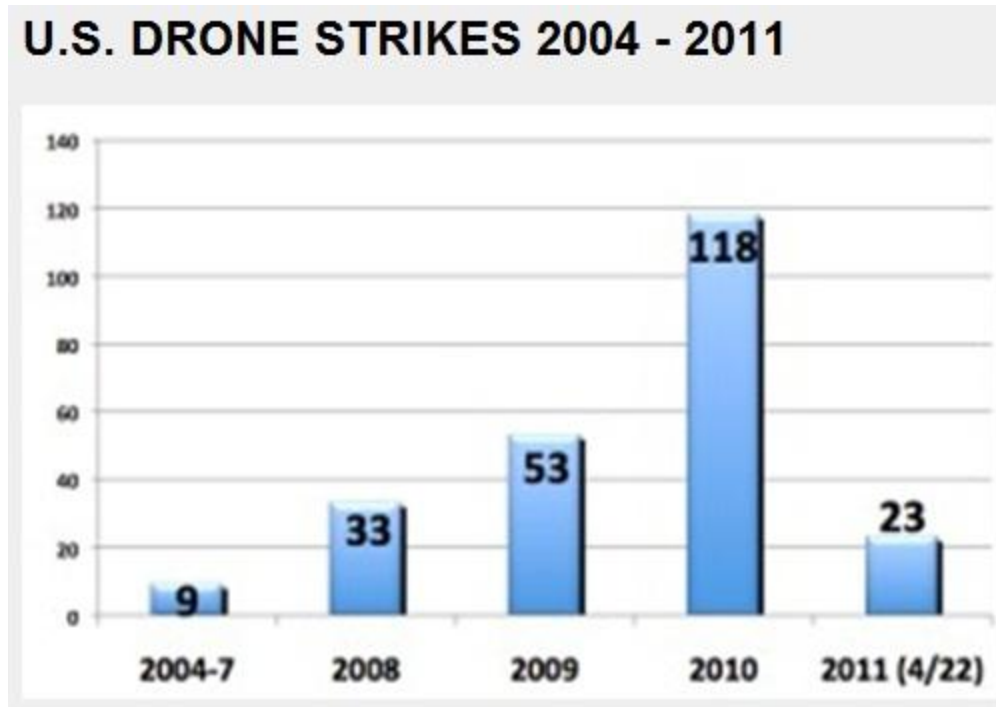


Figure 4. Drone Strikes in Pakistan 2004-2011

*Source:* Peter Bergen and Katherine Tiedemann, *The Year of the Drone* website, <http://counterterrorism.newamerica.net/drones> (accessed 25 April 2011).

The timing of this event occurring in early September 2008 allows some further analysis. This time coincided with a drawing down of American forces in Iraq and the subsequent increase in operations within Afghanistan. As figure 4 shows, the use of remotely piloted aircraft to strike targets inside Pakistan continued to rise while any publicly acknowledged incidents involving manned assets remain elusive and difficult to find. One such incident occurred in late September 2010 when North Atlantic Treaty Organization helicopters crossed into Pakistani airspace on four separate occasions to conduct attacks while “chasing insurgents across the border into their safe havens” (Crilly and Farmer 2010). Three Pakistani soldiers were killed in the fourth strike prompting the closure of one of the ground supply routes for the coalition forces inside Afghanistan

(Perlez and Cooper 2010). Whether the reaction would have differed if these attacks had been conducted by remotely piloted aircraft remains difficult to ascertain; however, Peter Bergen and Katherine Tiedemann's drones database at the New America foundation lists twenty-two attacks by unmanned aircraft during September 2010 without any significant outcry (Bergen and Tiedemann 2010). An article from the New York Times captured this sentiment well when stating that "the border closing, and the exceptional series of strikes by piloted aircraft, as opposed to drones, signaled a general increase in tensions between Pakistan and the United States" (Perlez and Cooper 2010). Despite the myriad of complexities surrounding this incident, one gains important insight simply by understanding the fact that a general theme present throughout a majority of the literature discussing these attacks includes a discussion about how manned assets conducted them as opposed to a remotely piloted vehicle. These examples help show the emerging variances seen when an unmanned platform carries out an attack versus an attack by actual soldiers. In general, the use of unmanned assets appears to portray a less intrusive method of conducting warfare despite the fact that they use the same weapons as manned platforms.

With a basic understanding of perception differences established, this discussion warrants further expanding the previously mentioned factors surrounding a cost versus benefit analysis. Peter Singer captures some of the best information available regarding the cost-benefit ratio of unmanned warfare in his book *Wired for War* detailing thoughts from several leading experts in this area of interest. The reduced cost of war, or at least a perceived reduction in cost in terms of lives and money, weighs in on one side of the

cost-benefit ratio altered by unmanned warfare allowing the potential for a relaxed use of the military by senior government leaders.

Singer asked Larry Korb, a significant figure in “Washington’s defense policy establishment” and a former assistant secretary of defense within the Reagan administration, for his opinion on the “most important over-looked issue in Washington defense circles” (Singer 2009a, 315). Korb expressed his concern over “robotics and all this unmanned stuff” and specifically mentioned two questions: “what are the effects and will it make war more likely” (Singer 2009a, 315). Korb goes on to describe two specific issues, “both of which he fears will make war more likely” (Singer 2009a, 316). He feels robotics and unmanned systems will “disconnect the military from society” and that the “seductive” nature of technology may change the way “leadership might look at war and its costs” (Singer 2009a, 316).

Disconnecting the military from society essentially occurs because the reduction in risk to American forces results in the lack of concern by the public for loved ones. Fewer lives of America’s sons, daughters, brothers, and sisters get put into harm’s way and therefore the personal connection to a war erodes for many Americans. Singer points out the fact that this concept lies at the heart of “democratic peace,” or the concept that a population invested personally in the cost of foreign policy creates a “built-in connection between their foreign policy and domestic politics” (Singer 2009a, 316). The following excerpt from *Wired for War* illuminates this point best:

When the people share a voice in any decision, including whether to go to war, they are supposed to choose more wisely than some king or potentate. As one Pentagon official explains, this sense of shared participation and ownership is the key aspect in making the right decisions on when to start and end wars. “The



Army belongs to the American population, and not the President or Congress.”  
(Singer 2009a, 317)

Removing the risk for operators of unmanned assets means that beginning or continuing a conflict simply requires more investment of money and not necessarily more people or the associated sacrifice. Again, this point somewhat oversimplifies the actual requirements for using remotely operated systems; however, it does clearly lay out the potential created by unmanned capabilities to remove a number of the roadblocks that government leaders historically had to overcome when utilizing the military instrument of national power. The technological lure referenced by Korb leads into the increased benefits provided by unmanned warfare.

The current capabilities of persistent observation and persistent strike generated by remotely piloted aircraft provide two specific potential benefits to leaders when weighing a decision on whether to engage in military action. First, these capabilities combine the present technological advantages possessed by the United States and its allies decreasing the likelihood of mission failure due to misidentification of a target or operator errors while setting up an attack. Basically, increased time over potential targets without increased risk to human life provides additional flexibility during mission execution. Second, unmanned platforms provide a new method to intervene in situations that would present extreme risk for pilots or aircrew in the event that they get shot down. Images from Mogadishu and the story of *Black Hawk Down* certainly remain embedded in the memory of most, if not all, of the senior government leaders. Singer points out the “horrors of Bosnia, Rwanda, and the Congo” where many nations watched but “did little” to stop the atrocities, but he then goes on to suggest that given a similar situation,

“substitute in unmanned systems and the calculus might be changed” (Singer 2009a, 322).

Another expert interviewed by Singer in 2006 expressed similar thoughts and supports the notion that a change in the cost versus benefit equation could increase the likelihood of military options being used. James Der Derian focuses on “new modes of war” and calls technology “very seductive” with the potential to “offer leaders spectacular results with few lives lost” (Singer 2009a, 321). He goes on to say that “if one can argue that such new technologies will offer less harm to us and them, then it is more likely that we’ll reach for them early, rather than spending weeks and months slogging at diplomacy” (Singer 2009a, 321). Singer states that “nations often go to war because of overconfidence” (Singer 2009a, 321). Add in a vast technological advantage for one side and the resultant situation presents a scenario where the Department of Defense may provide the quickest and least costly solution.

Finally, although the exact connections between the potential to relax the use of military force due to unmanned warfare and the significant increase in drone strikes within Pakistan over the past few years remain difficult to tie down, readily apparent is the fact that unmanned combat platforms operated at increasingly higher rates within an area essentially untouchable by manned assets. Unmanned combat platforms provided a much needed capability within the Afghan operational environment and allowed the use of the military instrument of national power in an area that otherwise may not have permitted such action. As for whether all of these facts make war more likely, the figure below, a far from scientific poll on the webpage for Singer’s book *Wired for War*, nonetheless leaves an interesting place to not only conclude this discussion, but more

importantly, to generate future discussion and contemplation of the far reaching effects of unmanned warfare.



Figure 5. Will the robotics revolution make war easier or harder to start?  
Source: Peter W. Singer, *Wired for War* website, [http://wiredforwar.pwsinger.com/index.php?option=com\\_poll&view=poll&id=16&Itemid=53](http://wiredforwar.pwsinger.com/index.php?option=com_poll&view=poll&id=16&Itemid=53) (accessed 26 April 2010).

### Detailed Summary of Effect

Due to the decreased cost associated with armed conflict and the increased potential benefits of engaging in such action, the introduction of unmanned warfare allows for a relaxed use of the military instrument of national power. Many different factors play into when and where national leaders use military force and an exact cause and effect relationship in this case is difficult to establish. With that said, the fundamental interactions between the capabilities provided by unmanned assets and the cost versus

benefit analysis used to determine how to respond to a deteriorating situation generally shift the balance of the scale in the direction supporting the use of military force.

By reducing the overall risk to military men and women, the American public loses the personal attachment to the decision to use military action resulting in a disconnect where the general population gives more leeway to government leaders than would be afforded when placing United States and allied soldiers lives at risk. Furthermore, decision makers weighing the costs of a conflict with increased unmanned systems look heavily at the costs of a war associated with equipment which can be replaced much more easily than a human operator that requires years of training. Clearly, the amount of national investment and associated risk taken on in a war goes down when placing fewer manned assets in harm's way.

Along with this reduction in cost, unmanned combat platforms increase the potential benefits of taking military action. From the capability to increase the likelihood of success through greater flexibility to the options provided in extreme risk scenarios, government leaders and their constituents alike may see an opportunity to shape a situation using military means as the most logical and cost effective. With the added benefit of rapid response provided by the military, leadership could determine that engaging a problem with armed action presents the greatest chance of a positive outcome before an enemy commits even greater atrocities. Combined, the effects of unmanned warfare on both the costs and benefits of instituting the military instrument of national power provide for a trend in the direction of a relaxed stance in foreign policy.

## Effect Applied to the Battlefield

In March 2011, internal fighting on the ground in Libya intensified and the United Nations Security Council passed Resolution 1973 authorizing the use of “all necessary measures to protect civilians under threat of attack” (United Nations Security Council 2011). The United States joined a number of other nations in the initial attacks in an attempt to neutralize Libyan military forces and reduce their capability to further harm civilians. Shortly thereafter, the United States handed over control of the operations to North Atlantic Treaty Organization forces and stepped back into a supporting role. Despite the desire to reduce American involvement, several weeks later on 21 April 2011, President Barack Obama authorized the use of armed Predators to attack targets in Libya due to their “unique capabilities” (British Broadcasting Corporation 2011). Around the same time, Vice-chairman of the Joint Chiefs of Staff, General James Cartwright, highlighted the specific benefit of “[the Predator’s] ability to get down lower and therefore, to be able to get better visibility” on the battlefield (British Broadcasting Corporation 2011).

The difference giving a Predator the “ability to get down lower” derives from the lack of risk to a pilot sitting in the aircraft and not from any capability to fly at a lower altitude over a combat zone than a manned platform. This “unique capability” possessed by the United States allowed for the use of additional direct military action during a situation where American forces had stopped airstrikes from manned platforms. Of note, the crew of an American F-15E Strike Eagle ejected over Libya during the initial attacks in March 2011. What role this fact may have played in the decision to conduct additional strikes from remotely piloted aircraft is not entirely clear. However, based on the

previous discussion in this thesis regarding the potential for a relaxed use of the military instrument of national power, this scenario highlights a case where the costs association with military action lowered considerably due to the capabilities of unmanned assets. Additionally, the persistence and lower altitudes of the Predator aircraft provide for a higher chance of hitting the correct targets and a corresponding reduction in the possibility of collateral damage killing civilians. In the end, senior leadership viewed the “unique capabilities” of the armed remotely piloted aircraft in such a manner that allowed for their use in a combat zone where manned aircraft were not allowed to strike additional targets.

### Conclusion

Throughout this chapter, the discussion and analysis presented answers to the primary research question dealing with the second and third order effects produced by the introduction of unmanned warfare in Afghanistan from 2001 to 2010. The effects described above contain their own specific nuances and complexities, but each one ultimately resulted from the fielding of an entirely new and revolutionary method of engaging in armed conflict. Through the distancing of combatants from the battlefield, unmanned platforms changed the very nature of what it means to be a warrior and fight the nation’s battles. The fact that this change occurred so rapidly and took place in the years leading up to the attacks of 11 September 2001 further complicated the situation for this new breed of war fighter. Specifically, the policies from national level leaders did not clearly lay out a foundation upon which to build this new capability and continued to lag for a significant period of time.

Despite the vast number of obstacles presented to those operating armed remotely piloted aircraft, the new capabilities of persistent observation combined with persistent strike allowed a shift in the historical roles of the primary battlefield observer. Modern battlefields will likely see situations where the pilots and sensor operators of unmanned assets have an ability to get to know the local “beat” of an area and provide a differing perspective to the commanders on the ground. Finally, unmanned warfare creates “unique capabilities” that prove extremely useful in many situations; however, these same capabilities alter the decision making process surrounding the use of military force by reducing the costs and increasing potential benefits to such an extent that a relaxed use of the military instrument of national power can result. This chapter primarily provided a historical look at these effects and their impact on different aspects of the operational environment surrounding the conflict in Afghanistan during the first ten years of the twenty first century. Chapter 5 will further this discussion by focusing this analysis into more fundamental conclusions and then linking the resulting findings to recommendations that can help mitigate the negative aspects while continuing to enhance the amazing potential presented by unmanned warfare.

## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### Introduction

Throughout history many innovations and new technologies have shaken the existing military establishments in ways that fundamentally changed the nature of a particular method of warfare, and at times, the entire dynamic of war. This thesis highlights the many complexities generated by the introduction of a new way to wage war in the modern era of globalization and interconnected societies. Specifically, this discussion provides insight into the significant second and third order effects stemming from the Afghan operational environment between 2001 and 2010 due to the use of unmanned warfare. This chapter builds on the outcomes described in the previous chapter and will build each of the four findings by first laying out the meanings and implications in a conclusions section. Next, a recommendations section will describe three specific recommendations derived from the results of this research and lay out several unanswered questions as well as areas for additional research in the field of unmanned warfare.

Despite the many factors influencing the current operational environment within the region surrounding Afghanistan, the research for this thesis effectively identified four significant second and third order effects stemming from the introduction of unmanned warfare. First, the pilots and sensor operators of remotely piloted aircraft conducting combat missions from within the United States experienced new and unique situations because of the ability to remove them from the battlefield. As a result, the fundamental nature of this new generation of combatant changed and imparted unexpected stresses



and strains on not only the individuals, but also the nation as a whole. Second, the timeframe containing the year leading up to the hostilities in Afghanistan and continuing for the first few months thereafter exposed a lagging policy from the national level as it dealt with the rapid changes in warfare made possible by a new technology. This policy lag left the Department of State and Department of Defense in an environment with unclear direction on the future of unmanned warfare to include who, when, where, and exactly how to incorporate this new capability into the greater national security policies. Third, the specific capabilities of unmanned warfare in providing persistent observation and persistent strike generated a shift in the primary role of the battlefield observer where certain situations found the pilots and sensor operators half a world away providing critical real time information to the commanders on the ground. Fourth, the increased need for combat operations between 2008 to 2010 in the border region of Afghanistan and Pakistan demonstrated a scenario where the new capability to employ unmanned platforms allowed more flexibility and suggests the potential for a relaxed use of the military instrument of national power. These findings, although interesting in their own right, gain significant usefulness through further examining their fundamental meanings and implications.

### Conclusions

Each of the four significant effects described above from the Afghan operational environment provide unique insight into the understanding of how unmanned warfare fundamentally changes certain aspects of combat. From the changing nature of combatants to the relaxed use of the military instrument of national power, all the way through the policy lag and ultimate result of persistence over a battlefield, these effects

cause far reaching changes on the overall operational environment. Breaking down the changes presented by each of these areas of interest yields the following conclusions.

The United States introduced the use of lethal force from an unmanned platform in the skies over Afghanistan in the fall of 2001 and effectively removed some of the major combatants in that conflict from the actual battlefield. In doing so, the very nature of this new breed of combatant changed. This next generation of war fighter no longer experienced the death and destruction of combat with their naked eye; however, they still observed the graphic scenes in real time and often for much longer periods of time than the warriors of the past. The first major conclusion of this research lies in the fact that the operators of unmanned assets still experience the effects of combat much like any other combatant. The pilots and sensor operators of remotely piloted aircraft experience post traumatic stress and the additional burdens placed on military members resulting from the requirement to take human life in the execution of their duties. Future combat scenarios with increased numbers of unmanned combat vehicles will undoubtedly see this same effect propagated throughout the military forces due to the same factors experienced by this first generation of remote combatants.

The removal of primary combatants from the battlefield produced effects that extended beyond just the operators of remotely piloted aircraft and placed new dynamics on the civilian population as a whole. Active “trigger pullers” engaged in combat on a daily basis live side by side with the rest of the American population in an increasing number of areas throughout the country. Little debate exists as to the fact that these combatants remain lawful targets during a time of war despite the fact that they reside within the civilian population. One could argue that certain scenarios make the operators

of unmanned assets high payoff targets for an enemy force to engage. This new dynamic of unmanned warfare places an inherent assumption of risk on certain segments of the civilian population simply because one of these new combatants moves into their neighborhood. In addition to this inherent risk, a higher level of daily interaction between America's active war fighters and the civilian population exists today than it did in previous wars. From the local parent teacher's association meetings to the weekly soccer games, the everyday lives of a number of Americans now includes direct contact with individuals actively engaged in combat operations merely hours before. Ultimately, the distancing of United States combatants from the front lines of a war drives the realities of war into new areas of society and the nation as a whole.

This shift of combatants occurred as the technology rapidly advanced allowing the arming of remotely piloted aircraft and impacted the national level policy makers as well. The processes in place during the early years of the twenty first century to determine national security policy did not maintain pace with the capabilities provided by unmanned assets. A policy lag resulted in which the senior leadership in the Department of State and the Department of Defense remained uncertain as to who would operate lethal unmanned combat assets as well as when, where, and how they would be incorporated in the overall national security policies. The continuing increase in the pace of advances in computer processing capabilities combined with further advances in automated systems show a picture of an environment that will only exacerbate the effect experienced during the introduction of the armed Predator aircraft. The two conclusive requirements resulting from this policy lag effect include the need for at least broad based policies dealing with expected advances in technology prior to their maturation and

increased flexibility from most, if not all, of the various governmental agencies involved in the implementation of these new capabilities. Clear guidance and flexible leadership can help maximize the positive effects generated by new technologies such as those created by the increased persistence of unmanned assets.

Two specific concepts of persistence dramatically alter the potential for battlefield observation. The first concept derives from the capability of remotely piloted aircraft to loiter above a particular area for much longer periods of time than manned assets. During an operation, a ground commander now maintains a consistent level of capability from the supporting aircraft as well as the individuals operating them. With an MQ-9 Reaper, the operators can maintain eight to ten hours of time on station prior to being replaced by another crew and only the depletion of weapons or the lack of a replacement drone limit the actual aircraft capabilities. By utilizing aerial refueling, manned assets can attain this same level of support; however, the crews operating manned assets become significantly more fatigued than those of unmanned assets, specifically if attempting to continue a cycle of support over a period of multiple days with the same crews. The resultant capabilities of persistent observation and persistent strike allow certain situations in which primary battlefield observation for a commander comes from individuals actually sitting in the United States. This effect becomes amplified in remote areas of a battlespace as well as in situations with limited actual ground presence such as area security operations.

The second concept of persistence focuses on the capability of unmanned combat platform operators to remain engaged within an area of operations for weeks, months, or even years at a time. This long term continuity provides a new level of situational

awareness and situational understanding not typically attainable with the deployment rotation cycles used for the manned combat platform force. Pilots and sensor operators of remotely piloted aircraft become very well acquainted with many of the nuances present within a particular area and develop a certain feel for what constitutes normalcy within that region. This knowledge, when passed on to other forces, provides a new and extensive level of understanding for ground commanders when faced with a situation where limited assets prohibit a high level of ground presence throughout an entire area. The addition of lethal force into unmanned asset capabilities allows senior leaders to translate this increased understanding into action and subsequently impact the actual ground situation. This added ability to influence areas of a battlespace which previously remained outside the sphere of influence for military operations gives national leaders another factor to weigh into the equation when deciding when and how to implement foreign policy decisions.

Along with the increased potential benefits generated by persistent strike, a lowering of the costs associated with war, due to the reduction in risk to American military members, directly impacts the decision making processes used to determine which instruments of national power to use to influence a situation. A society disconnected from the sacrifices of war and a perception that unmanned combat represents a less intrusive method of lethal force support the potential for a relaxed use of the military instrument of national power. The removal of direct human sacrifice from unmanned warfare potentially makes the option of military force a more cost effective endeavor and therefore more likely to be implemented across a wider range of conflicts concerning foreign policy. Unfortunately, the implications of using military action rarely

fit neatly into a predetermined construct and the fog and friction of war often result in outcomes vastly different from those expected at the beginning of hostilities. And while a quick, surgical strike may appear to provide a very cost effective method to deal with a deteriorating situation, only through the appropriate integration of all aspects of national power can one hope to achieve a long term lasting solution. The potential of unmanned warfare to shift the balance of the application of national power certainly emerges as a significant area requiring careful examination and understanding.

### Recommendations

Throughout the development of the significant second and third order effects of unmanned warfare and their specific meanings to the Afghan battlefield, one overarching recommendation emerged. The United States must continue its heritage of staying in the forefront of future technologies while at the same time striving to understand the vast complexities and side effects inherent to each. In this endeavor, senior leadership should maintain a forward looking posture and preemptively address both the areas with potential for increased benefit as well as those needing resources allocated to mitigate possible negative unintended consequences. Three specific recommendations with potential to help shape this effort include the requirement for an in depth review of the consequences of fighting a war from the homeland, developing baseline policies to guide anticipated future technologies, and fully developing relationships between and within government agencies to maximize emerging capabilities such as persistent observation and persistent strike. Along with these recommendations, a number of additional areas of research remain for future development.

The first specific recommendation centers on one such area needing additional examination. This thesis highlighted a number of areas that emerged following the implementation of conducting combat operations from the United States using remotely piloted aircraft; however, an extensive in depth review should be conducted with the goal of identifying the myriad of additional side effects created specifically by the capability to fight a war from half a world away from the battlefield. The results generated from this area of research would allow both military and civilian leadership the capability to properly address the requirement for support networks to help alleviate the pressures of combat stress and what, if any, measures need to be taken to mitigate the risk to both remote operators as well as the civilians living in and around the same neighborhoods.

Along these same lines, senior leadership needs to actively weigh these increased risks into the equation when deciding on future locations to conduct unmanned combat operations from. Peter Singer suggests that one potential solution for units stationed within the United States might be to “operate like many professional sports teams do before big games” and isolate personnel involved in combat operations (Singer 2009a, 347). Taking this a step farther might include developing isolated “deployment” locations within the homeland designed with the sole purpose of conducting unmanned combat operations. While not necessarily viable in such a simplistic nature, this example shows at the very least the requirement for this area of study to continue.

The second specific recommendation to help address the conclusions found in this thesis focuses on the requirement to develop baseline policies for certain anticipated future technologies. Two sides exist to this coin. First, the United States must engage in a discussion both at the national levels as well as within local communities to determine

how far the future capabilities of their own forces should proceed down the path toward the automation of war. However, these discussions cannot occur in a vacuum and individuals need to take into consideration the results of limiting future combat capabilities in a world where potential adversaries may not adhere to the same standard of moral and ethical understanding. At the simplest level, if an adversary develops lethal combat capabilities augmented by a decision matrix utilizing artificial intelligence that makes decisions on the hundredth or thousandth of a second scale, the systems requiring human interaction may quickly become obsolete. Again, this example does not attempt to fully develop any scenarios or conclusions, but rather show one possibility where failure to develop well thought out policy may now result in catastrophic results down the road.

The third and final specific recommendation highlights the concept that future operations will require a comprehensive and open minded approach to reach their maximum potential. The new capabilities presented by remotely piloted aircraft of persistent observation and persistent strike show one excellent example of how the Department of Defense must fully develop the relationships between the Army commanders on the ground and Air Force units located halfway around the world. These relationships must not only exist within the specific government departments, but also between the various agencies. Today, many of the capabilities of the Predator and Reaper aircraft could potentially provide a decisive advantage to another arm of the government if properly understood. For example, the ability to quickly survey land or show real time overhead images to local farmers through a video downlink could provide critical and unique capabilities to the Department of Agriculture, but without the appropriate relationships, this potential will never be realized. The current trend toward fully



incorporated transition teams within Afghanistan have the potential to provide a framework for these relationships and should continue to be developed.

The three specific recommendations above provide focused areas for emphasis as they relate to the future of unmanned warfare. They do not attempt to encompass the entire spectrum of issues presented by unmanned warfare, nor do they address a number of additional areas requiring future development and continued attention. During the research for this thesis three additional areas of interest emerged concerning the effects of unmanned warfare which, while not developed to the same level of fidelity as those included in chapter 4, deserve mentioning here for possible future research. First, the concept of flattening the command and control structures within the military chain of command began to take form due to the unique abilities to transmit the data from unmanned assets to virtually anywhere in the world. The basic premise considered with this effect centered on the concept of the “tactical general” and “strategic corporal” each engaging in actions with ramifications historically seen at other levels within the chain of command. Next, the same rapid technological development responsible for the effect of policy lag presented similar issues in the area of doctrine. Ultimately however, the research done into this area of interest found that the flexibility and ingenuity of soldiers on the ground combined with that of the pilots and sensor operators of remotely piloted aircraft successfully used existing doctrine as a jumping off point while the new doctrine developed. Finally, the research for this thesis included examination of a potential reduction in support from the local populace due to the use of unmanned assets. The resulting information neither supported nor discredited this concept as it pertained to the Afghan operational environment. In general, the concept of Americans using drones

seems to illicit negative feelings from those living within an area of operations; however, many of these same individuals within the Afghanistan region likely did not know which type of aircraft conducted an attack and this fact may account for the lack of an ability to develop this issue further.

### Summary

The concept of and desire to conduct war from distances far removed from the actual battlefields began long before the current conflict in Afghanistan. However, until recent develops in global networks and the miniaturization of computer technology these ideas remained out of reach. On a fall day in 2001, the first Hellfire missile left the weapon station of a Predator aircraft being remotely piloted from thousands of miles away. This new capability to conduct unmanned warfare provided enormous advantages to the United States seen directly on the battlefield and at the same time created a number of second and third order effects visible throughout the entire Afghan operational environment. The four most significant second and third order effects included a change in the very nature of combatants, a national policy which lagged the new capabilities, a shift in the roles of the primary battlefield observer, and a potential relaxed use of the military instrument of national power. Each of these effects will likely impact future combat operations not only during the use of current unmanned combat platforms but also when employing new unmanned assets yet to be developed.

The United States must continue to strive to remain ahead of other nations in the development of these new capabilities while at the same time taking into account potential side effects and leveraging new technologies to maximize the strength of all aspects of American power and influence. Specifically, further understanding of the

consequences of placing active combatants side by side with the American population needs to be developed. In addition, effective development and implementation of future technologies requires a basic foundation of national policies directed specifically at anticipated capabilities to help guide the way. Finally, future conflicts will require a whole of government approach and the benefits provided by unmanned assets can only mature to their highest levels through the development of strong interconnected relationships throughout all agencies within the national government. None of the above requirements present the United States with insurmountable tasks. To the contrary, the future success of unmanned warfare within the overall construct of American foreign policy only requires fostering the same qualities of personal drive and a never ending desire for excellence displayed throughout the entire history of the United States.

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